

ICT/DM

San Diego/Imperial Counties

- **Cybersecurity Profile and Strategy**

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Overview

- ICT/DM Sector
- Methodology
- Certifications
- Labor Market Info
- Trends
- Recommendations

Overview of Subsectors

Behind the Screen			In Front of the Screen		
Networking - Cybersecurity	Computer Science (Transfer)	Tech Forest	Business Software Apps	Digital Media	Entertainment
Infrastructure for communication (LAN, WAN, wireless, mobile)	Software Development [Desktop, Web, Mobile]	Operating Systems (Windows/Linux)	Business communications	Design apps (Photoshop) for print, web and mobile	Radio/TV production
Information security/Privacy (project management, policy management, auditing)	Data Structures	Databases	Office apps	Audio (esp. for eGaming, podcasts, radio/TV)	Commercial music, journalism (writing, recording, editing)
Cyber threats, vulnerabilities (penetration testing, auditing, scripting)		Cloud computing	Document management	Web/mobile layout, editing, animations	

Cybersecurity Sub-sector

- Cybersecurity sub-sector accounts for 8,450⁽¹⁾ - 10,421⁽²⁾ total jobs in the San Diego/Imperial Region with approx. 1,532⁽¹⁾ - 1,922⁽³⁾ average annual openings
- There are more than 150 establishments in the region
- This sub-sector is projected to grow 11⁽¹⁾ - 28%⁽⁴⁾ (avg. 11,359 jobs) in the next five years
- Cybersecurity is considered resilient sub-sector⁽⁵⁾



1) Source: San Diego Cyber Center of Excellence (SD EDC), 2019 Annual Report; 2) Source: Cyberseek.org; 3) Period 2018-2023 - Research conducted by WestEd, Apr. 2020 – San Diego/Imperial Counties Opportunity Assessment <https://ictdmsector.org/achieving-ccc-metrics-through-market-intelligence/>; 4) Bureau of Labor Statistics through 2026; 5) San Diego COE Resilient Jobs Report, AUG 2020

Major Employers (military)

- Military, DoD, Federal Gov't, Contractors (23% of *all* jobs in SD)⁽¹⁾:
 - NAVWAR (prev. SPAWAR) * **(42% of all SD cyber jobs)**



BAE SYSTEMS

Booz | Allen | Hamilton



Raytheon

ViaSat



**SENTEK
GLOBAL**



**NORTHROP
GRUMMAN**

Others Include:

Accenture, Engility (SAIC), Leidos, **Perspecta**, Serco, Solute, Titanium Cobra Solutions, T-Solutions, Tevora, **US Dept. of State**

Major Employers (non-military)

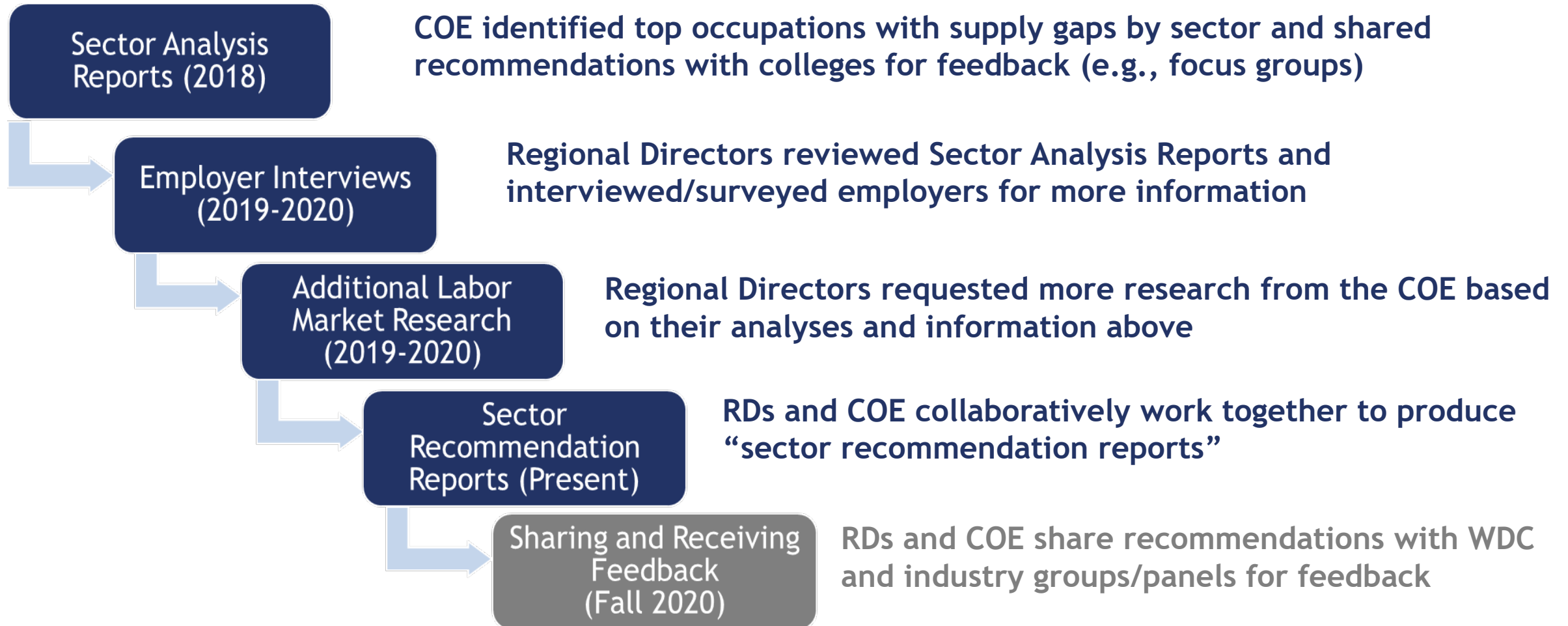
- Employers may have positions that do not require security clearance:










Others Include:

- GoSecure (formerly EdgeWave), Locton Insurance, **Kforce (staffing agency)**, PriceWaterHouseCoopers (PWC), Profico, Redhorse, **Sharp**, **TEKSystems (staffing agency)**, UCSD, **UnitedHealth Group**

Methodology






Career Ladder – Cybersecurity (less than Bachelor)

Education	Positions	Skills & Competencies
<p>Middle-skill High school diploma + work experience or Post-secondary non-degree award or Associate degree +</p> <p>Industry certifications⁽¹⁾:</p> <ul style="list-style-type: none"> • CompTIA: Security+, CySA+ • Cisco: CCNA • ISACA: CISA • EC-Council: CEH • AXELOS: ITIL • SANS: GIAC 	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> Network Administrator⁽⁵⁾ \$95K/year </div> </div> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> Information Security Analyst⁽³⁾ \$93K/year </div> </div> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> Project Manager⁽¹¹⁾ \$87K/year </div> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> Intern \$18/hour - \$37K/year⁽⁷⁾ </div> </div> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> Technical Support Specialist \$50K/year </div> </div> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> IT Technician⁽⁴⁾ \$34K/year </div> </div> </div>	<ul style="list-style-type: none"> • Knowledge of intermediate Networking • Knowledge of cloud frameworks/API • Knowledge of security policy frameworks • Skill in project management • Skill in running SQL queries (if software security role) <ul style="list-style-type: none"> • Ability to work on a team • Ability to think analytically • Knowledge of system administration • Knowledge of customer service
<p>Entry-level High school diploma or Less than high school diploma</p>	<div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; width: 100px;"> Customer Service⁽⁶⁾ \$37K/year </div> </div>	<ul style="list-style-type: none"> • Operating Systems (esp. Linux) • Tech Literacy

1) 59% of cybersecurity jobs require an industry certification - source: Burning Glass 2019 Cybersecurity Jobs Report; 3) "Information Security Analyst" (SOC 15-1122) median salary; 4) "Computer Repair Technician" Robert Half Salary Guide 2020; 5) "Network and Computer Systems Administrators" (SOC 15-1244) median salary; 6) "Customer Service" (SOC 43-4051) median salary; 7) "Computer User Support Specialist" (SOC 15-1151) 10th percentile; temporary position; annual wage listed only for reference, most interns are part-time; 11) "Computer and Information Systems Managers" (SOC 11-3021) 10th percentile; All salary data from EMSI. 2020.04. Self-employed + QCEW + non-QCEW unless otherwise stated

Career Ladder – Cybersecurity (Bachelor or higher)

Education	Positions	Skills & Competencies
<p>Higher skill Bachelor of Arts/Science + work experience + Industry certifications⁽¹⁾:</p> <ul style="list-style-type: none"> • CompTIA: CASP+ • (ISC)²: CISSP 	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> Security Architect⁽¹⁰⁾ \$119K/year </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> Penetration Tester⁽¹⁰⁾ \$85K- \$158K/year </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> Cybersecurity Manager⁽⁸⁾ \$103/year </div> </div>	<ul style="list-style-type: none"> • Knowledge of advanced networking • Knowledge of ethical hacking practices • Ability to perform penetration testing on applications, systems and networks (non-managerial) • Ability to create strategic plans and implement security policy (managerial)
<p>High skill Bachelor of Arts/Science + work experience + Industry certifications⁽¹⁾:</p> <ul style="list-style-type: none"> • CompTIA: PenTest+ • Cisco: CCNP, CCIE • (ISC)²: CCSP • ISACA: CISM • EC-Council: ECSA, CHFI 	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; text-align: center;"> Programmer⁽⁹⁾ \$88K/year </div> </div> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; text-align: center;"> Security Engineer/Architect⁽¹⁰⁾ \$124/year </div> </div> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; text-align: center;"> Risk Manager/Auditor \$95K/year⁽⁸⁾ </div> </div> </div>	<ul style="list-style-type: none"> • Knowledge of scripting language (for automation)⁽²⁾ • Knowledge of tools related to information security, cryptography, network scanning • Knowledge of cybersecurity and privacy principals • Ability to identify basic coding flaws at high level

1) 59% of cybersecurity jobs require an industry certification - source: Burning Glass 2019 Cybersecurity Jobs Report; 2) Automation of auditing/risk assessment provides 15% salary uplift - source: Burning Glass 2019 Cybersecurity Jobs Report; 4) "Computer Repair Technician" Robert Half Salary Guide 2020; 8) Cyberseek.com, 2020; 9) "Software Developer - Applications" (SOC 15-1132) 25th percentile; title may vary; 10) payscale.com, 2020; All salary data from EMSI. 2020.04. Self-employed + QCEW + non-QCEW unless otherwise stated

Context for Skills & Competencies

- Importance of industry-recognized certifications⁽¹⁾ and experience over formalized degree
- Auditors should have CISA/CISM certifications but must be familiar with NIST 800-171⁽²⁾ (primarily military/DoD and contractors)
- Challenge for non-citizens and those with criminal record (security clearance required for DoD, military, contractors)
- Opportunity for project management, non-programmers (management track, policy)
- Linux knowledge is critical for success (most cyber tools require – e.g. Kali)

1) Certificates must meet DoDD 8140 (DoDD 8570)⁽¹⁾ for cyber workforce DoD, military positions for certificates to be recognized directly – source:

<https://public.cyber.mil/cw/cwmp/dod-approved-8570-baseline-certifications/>; 2) Cybersecurity control compliance for Controlled Unclassified Information (CUI)

Cybersecurity Certifications

Organization	Certification	Demand	
		Jobs ⁽¹⁾	Percent
CompTIA	Security+, CySA+, PenTest+, CASP+	2,325	79%
Cisco	CCNA, CCNP, CCIE	214	7%
(ISC) ²	CISSP, CCSP	154	5%
AXELOS	ITIL	98	3%
ISACA	CISA, CISM	90	3%
SANS	GIAC – (GSEC, GSNA, GICSP, GCIH, GCFA, GCED, GCIA)	33	1%
EC-Council	Certified Ethical Hacker (CEH), CHFI, ECSA	22	1%

1) Source: OCT2020 search on indeed.com for certification in San Diego

Labor Market Demand vs. Supply

- There is an opportunity in cybersecurity, however software development & cloud are bigger [but not mutually exclusive]

	Demand (Avg. Annual Job Openings)	Supply (Avg. Annual Awards) ⁽²⁾	Net Gap
Business Software Apps	26,820	14,128	12,692
Tech Forest	7,047	969	6,078
Computer Science (Transfer)	5,074	386	4,688
Networking - Cybersecurity	1,727 ⁽¹⁾	1,425	302
Entertainment	2,037	2,033	4
Digital Media	1,146	2,208	(1,062)

Source: 1) Average of WestEd and San Diego EDC for 2019; 2) "Annual persistent students", Research conducted by WestEd, Apr. 2020 – San Diego/Imperial Counties Opportunity Assessment <<https://ictdmsector.org/achieving-ccc-metrics-through-market-intelligence/>>;

Hourly Earnings by Representative Occupation

Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings
Computer and Information Systems Managers (11-3021) ⁽¹⁾	\$60.85	\$74.95
Information Security Analyst (15-1122)	\$37.16	\$46.62
Computer Systems Analyst (15-1121)	\$35.87	\$45.86
Database Administrator (15-1199)	\$34.44	\$45.20
Network and Computer Systems Administrators (15-1142)	\$33.94	\$41.54
Computer Occupations, All Other (15-1199)	\$29.56	\$42.21
Operations Research Analyst (15-2031) ⁽¹⁾	\$32.24	\$46.43
Computer Network Support Specialist (15-1231) ⁽¹⁾	\$24.97	\$34.53
Computer User Support Specialist (15-1232) ⁽¹⁾	\$21.90	\$28.00

Sources: "Occupational Employment Statistics", Bureau of Labor Statistics, 2019 unless otherwise noted; 1) EMSI. 2020.04. Self-employed + QCEW + non-QCEW

Note: Living wage for a single adult in San Diego County = \$15.99/hour

Cybersecurity CC Supply



Other Regional Cyber Programs

Organization	Preparation
ICOHS, New Horizons	Test Prep
UCSD Extension	Certificates
CIAT	Certificates / Associate
University of Phoenix, Capella, etc. (online)	Bachelor
National University	Bachelor / Master
DeVry / Keller Graduate School	Bachelor / Master
University of San Diego	Bachelor / Master

K-12 CTE Pathways

ICT courses constitute 10% of regional K12 offerings (compared to 36.3% in Arts, Media & Entertainment)⁽¹⁾

Organization	Preparation
San Diego Unified: Clairemont, Crawford, Henry, Hoover, Kearny, La Jolla, Mission Bay, Morse, San Diego, University City	ICT
Escondido Union: Escondido, San Pasqual, Valley	ICT
San Dieguito Union: Canyon Crest Academy, La Costa Canyon, San Dieguito Academy, Torrey Pines High	Computer Science
Sweetwater Union: Hilltop, Olympian ⁽²⁾ , Palomar ⁽³⁾	Computer Science
Carlsbad Unified: Calavera Hills Middle, Carlsbad	STEM / Computer Science
Oceanside Unified: El Camino [pending] ⁽²⁾	ICT
Poway Unified: Del Norte, Mt. Carmel, Poway High, Rancho Bernardo High, Westview	ICT
Vista Unified: Mission Vista, Rancho Buena Vista, Vista High	ICT / Computer Science
Grossmont Union: Monte Vista, El Capitan	ICT (Project Lead the Way)
Charter: SIA Tech (North County Independent Study, South County Independent Study, JobCorps), Steele Canyon	ICT

1) Source: West Ed, JAN2019; 2) Cybersecurity focus; 3) Prep for A+ certificate

Recommendations (CC **with** Cybersecurity Programs)

- Inventory of Programs with emphasis on CompTIA certs
 - Align curriculum to industry certification objectives and C-ID⁽¹⁾
- Apply to become Certification Provider Member / Academy
 - Webinars, posters, free faculty cert vouchers, faculty training, institution testing center
- Increase enrollment [from K-12] through cyber camps
 - Promote cyber camps through mentoring high schoolers & networking
- Host and/or promote cyber Meetups
- Encourage cyber faculty to join Infraguard⁽²⁾
- Create specific website landing pages for cybersecurity (similar to veteran services)

1) Downloadable C-ID draft Descriptors for cybersecurity: <https://drive.google.com/drive/folders/17rOlcBOJB9fzRbwQQ0EebVCmMe8mIm8y>; 2) <https://www.infragardsd.org/>

Recommendations (CC **without** Cybersecurity Programs)

- **Recall: 4th biggest opportunity behind cloud and software development**
 - Inventory of Faculty with expertise and industry certifications in cyber
 - Coordinate regionally to introduce or augment programs without saturating market
- Encourage faculty professional development in cyber as extension of existing programs
 - Software Development
 - Cloud
 - Networking
 - Project Management / auditing

Recommendations (K-12)

- Establish agreements for early college credit/dual enrollment
- Available Curriculum:
 - CETAP curriculum⁽¹⁾
 - National Institute for Cyber Education (NICE) Framework⁽²⁾
- Encourage student participation (outside of class):
 - Promote cyber camps⁽³⁾
 - Hackathons (especially those on community college campus)⁽⁴⁾
 - Careers in ICT/DM zoom conferences (flyer @ end of this presentation)

1) <https://cyber.org/>; 2) <https://www.nist.gov/itl/applied-cybersecurity/nice/resources/online-learning-content>; 3) <https://cyber-guild.org/> ,
<https://www.baycyber.net/> ; 4) <https://sdhacks.io/>

GRACIAS

THANK YOU

MERCI

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COMMUNITY COLLEGES

SAN DIEGO & IMPERIAL COUNTIES

CAREER EDUCATION

General Recommendations & Resources

- Learn & share best practices for educators
 - Weekly sector webinars: <https://ictdmsector.org/educator-webinars/>
 - San Diego Educator Advisory (2x/year): <https://www.freelists.org/list/sd4c>
 - SD/Imperial K14 Discussion Forums (3x/year): (flyer @ end of this presentation)
- Professional development
 - <https://www.wastc.org/> has highly subsidized training
 - <https://codinglist.com/>
 - YouTube
 - CompTIA Instructor Network (CIN) “Train the Trainer” – <https://ictdmsector.org/educator-webinars>
 - LinkedIn Learning: <https://www.linkedin.com/learning-login>

General Recommendations & Resources (con't)

- Encourage companies to offer all paid internships, provide competitive wages for workers to discourage leaving region and allow for better quality of life
- Promote telecommuting and more flexible work hours [even post-pandemic]
 - Est. 20% students are single parents⁽¹⁾
 - Long commute = reduced productivity, increased expense, frustration (ex. Chula Vista avg. commute time = 30.9min)⁽²⁾
 - Reduced environmental impact
- Implement “capstone” projects for team building and increased female engagement⁽³⁾
- Integrate classroom presentations by industry professionals (e.g. Nepris - <https://www.nepris.com/>)
- Contact RDEE for guidance

ICT & DIGITAL MEDIA SECTOR ACTIVITIES

The San Diego & Imperial Counties Community Colleges invite you to a series of VIRTUAL K-14 Educator and Student sessions highlighting the different careers in Information Communication Technologies (ICT) & Digital Media (DM) in San Diego and Imperial Counties!



REGISTER TODAY!



🎓 Educator Discussion Forums, click [HERE](#)

🎓 Careers in ICT & DM, click [HERE](#)

FALL 2020

K-14 Educator Discussion Forum

- Friday, November 20 ~ 2:00 - 3:00 p.m.
- Friday, December 18 ~ 2:00 - 3:00 p.m.



Indicates event is for Students, Parents and Educators via Zoom Webinar.

Questions? Contact Monica Rosas, K-14 Career Education Professional Development Coordinator at monica.rosas@gcccd.edu

SPRING 2021



Careers in ICT and Digital Media

Friday, January 22 ~ 2:00 - 3:00 p.m.

K-14 Educator Discussion Forum

Friday, February 19 ~ 2:00 - 3:00 p.m.



Careers in ICT and Digital Media

Friday, March 19 ~ 2:00 - 3:00 p.m.

K-14 Educator Discussion Forum

Friday, April 23 ~ 2:00 - 3:00 p.m.



Careers in ICT and Digital Media

Friday, May 21 ~ 2:00 - 3:00 p.m.